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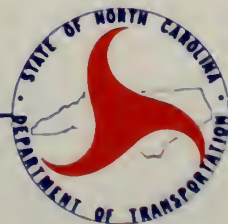
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SCOTLAND NECK

THOROUGHFARE PLAN



OCTOBER 1983





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SCOTLAND NECK THOROUGHFARE PLAN

Prepared by:

Planning and Research Branch,
Division of Highways,
North Carolina Department of Transportation

In cooperation with:

The Town of Scotland Neck
The Federal Highway Administration of
the United States Department of
Transportation.

October, 1983

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I. INTRODUCTION

The Town of Scotland Neck is located in southeastern Halifax County, a predominantly agricultural County which lies on the border between the Piedmont and Coastal Plains regions of North Carolina. Highway access to Scotland Neck is via US 258, NC 125 and NC 903.

A preliminary thoroughfare plan for Halifax County was developed in 1971 by the Thoroughfare Planning Unit of the State Highway Commission. This plan, which was not adopted, included several proposals in the Scotland Neck area. A thoroughfare plan for the Town of Scotland Neck was first proposed in the 1977 Land Use Survey and Development Plan prepared by NCDNER Division of Community Assistance. In this plan, NC 903 was routed across Main Street on Ninth Street. It was proposed that Ninth Street be extended westerly to connect NC 129 (Twelfth Street). It was also proposed that the center of street parking on Main Street be removed. The following recommended plan is based on the 1977 preliminary plan with some revisions. The plan was developed following the basic principles of thoroughfare planning described in Chapter II of this report. It is designed to handle problems and deficiencies through the year 2005.

II. THOROUGHFARE PLANNING PRINCIPLES

The primary objective of thoroughfare planning is to assure that the street and highway system will be progressively developed in a manner to adequately serve land use and travel desires. Other objectives include: (1) to reduce travel and transportation costs; (2) to reduce the cost of major street improvements to the public through the coordination of the street system with private action; (3) to enable private interests to plan improvements and developments with full knowledge of public intent; (4) to minimize disruption and displacement of people and businesses; and (5) to increase travel safety.

Thoroughfare planning objectives are achieved through both improving the operational efficiency of streets and improving system efficiency through better street coordination and layout.

Streets in a thoroughfare plan are classified according to the type function they perform. Major thoroughfares are the primary traffic arteries of an urban area. They may range from a two lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Elements of a major thoroughfare system include (1) radial streets which carry traffic to and from the central area; (2) crosstown streets which carry traffic across the central area; (3) loop thoroughfares which provide for travel between suburban areas; and (3) bypasses which serve primarily through traffic.

Minor thoroughfares are a second classification of streets which supplement the major thoroughfare system by facilitating minor through movement and collecting traffic from local access streets and carrying it to the major thoroughfare system.

Local access streets provide access to abutting property. Local access streets may be further classified as either residential, commercial, and/or industrial depending on the type land use which they serve.

III. POPULATION, LAND USE AND TRAFFIC

The factors of population, land use and traffic have a major role in determining the transportation needs of an area. Examination of these factors helps to explain historic travel patterns and is the basis for development of a thoroughfare plan.

Population

The Town of Scotland Neck experienced steady growth in population up to 1960 when the population began to decline. In the periods from 1960-1970 and 1970-1980 the Town's population decreased by 3.5% and 1.2% respectively. Table 1 shows population figures from 1950-1980 and projections to 1990 and 2005 for the Town of Scotland Neck and Scotland Neck Township. Despite the declining trend in population, the projected population of 3200 for Scotland Neck Town in the year 2005 is considered reasonable. The Town is actively seeking new growth opportunities which will improve employment and help to reverse the outward migration trend of the past two decades. Growth is expected to occur after the county-maintained water system begins supplying water to Scotland Neck.

Table 1

Population Trends & Projections for Scotland Neck, N.C.

	1950	1960	1970	1980	1990	2005
Town of Scotland Neck	2,730	2,974	2,869	2,834	3,000	3,200
Scotland Neck Township	5,122	5,699	5,013	4,592	4,800	5,200

Land Use

The generation of traffic is not only proportional to population; it is also related to the manner in which the adjacent land is used. In planning a thoroughfare system, it is important to look at past land use and predict future trends.

Within the Town of Scotland Neck residential land use is dominant and occupies nearly 60% of the developed land. The most recent residential growth areas have been in the northwestern and northeastern quadrants of the Town. A federally funded housing project has recently been constructed at the eastern end of 12th Street just beyond the Town limits. Future residential growth is expected to occur

within or adjacent to the Town limits with major growth areas being in the northwestern section of town, the southern end of Town, and west of SR 1151.

There are presently six manufacturing firms within the Scotland Neck planning area, two of which are within the corporate limits. It is believed that the county-maintained water system, which should begin supplying the Scotland Neck area in the near future, will attract new industry to the Town. According to the 1977 Land Development Plan, new industry is expected to locate in northeastern and southeastern sites in the planning area.

The central business district (CBD) is located on Main Street between 8th and 13th Streets. Other commercial areas are near the Brawley School Road-Railroad intersection and on Main Street south of 8th Street. In an effort to revitalize the CBD, future commercial growth will be directed primarily to the three block area on Main Street between 9th and 12th Streets. Some neighborhood business expansion is expected in the vicinity of the 12th Street housing project and near Poplar Street north of Brawley School Road.

Virtually all the land west of the Town limits is prime agricultural land. There are no plans for developing this area. Areas of public land use include those sites occupied by churches, schools, the medical complex, the National Guard Armory and the cemetery.

Traffic

The major street system in Scotland Neck is shown in Figure 1 with 1971, 1976, 1981 and projected 2005 average daily traffic (ADT) in terms of vehicles per day. Despite the decrease in population, traffic volumes have increased an average of 13% over the ten year period with the highest volume occurring on Main Street in the CBD. The 2005 traffic volume projections are based on past traffic trends and the anticipated increase due to new industry and population growth.

Scotland Neck's major street system consists of US 258, NC 903 and NC 125, all of which are presently routed through the CBD. Problems in the existing thoroughfare system that need to be resolved include:

1. Increased congestion on Main Street in the central business district.
2. Lack of a continuous east-west route.
3. Several substandard streets need improvement.

FIGURE 1

STREET NAME

STREET NAME

4500
4500
N/A
6800

2200
2800
N/A
4300

5800
8000
7000
10300

2700
2900
3100
4600

9800
11600
11100
15500

2300
2600
2500
3700

1750
N/A
N/A
N/A

8700
9700
9100
13400

3800
4400
4300
6300

3000
3200
3700
5400

400
N/A
500
750

3900
3900
4100
6000

2100
2400
2300
3400

STREET NAME

AVERAGE DAILY TRAFFIC

0000	YEAR	1971
0000	YEAR	1976
0000	YEAR	1981
0000	YEAR	2005



1995년 12월 27일 금 / 7월

IV. RECOMMENDATIONS

The recommended thoroughfare plan for Scotland Neck is shown in Figure 2 and described as follows.

Major Thoroughfares

US 258 (Main Street) provides radial access to Scotland Neck from the north and south. Being the only continuous north-south route through Scotland Neck, it also serves as a crosstown thoroughfare. The highest traffic volumes in the planning area occur on this route in the central business district with ADTs of 11,100 between Ninth Street (NC 903) and Twelfth Street (NC 125). The existing cross-section in the CBD is 72 feet; however, due to center-of-the-street and side parking there is only one travel lane in either direction resulting in an inadequate level of service.

By the year 2000, traffic volumes are expected to exceed the capacity on US 258 from 16th Street to the north corporate limits and approach capacity from the corporate limits to the northern boundary of the planning area. It is recommended that US 258 to the northern corporate limits be improved to a 36 foot section as shown in Figure 3, Section K.

NC 903 provides radial access to Scotland Neck from the east as Ninth Street and from the west in conjunction with NC 125 as Twelfth Street. It is recommended that NC 903 east of Main Street be rerouted on Twelfth Street to provide more direct cross-town movement and reduce some congestion on Main Street. Twelfth Street has a wider cross-section than Ninth Street and will provide sufficient capacity throughout the design period.

NC 125 serves as a radial providing access from the west as Twelfth Street and from the southeast. It is common with US 258 from the south end of town to Twelfth Street. With the exception of the segment through the CBD, NC 125 is adequate for the design period.

Brawley School Road. The improvement and extension of Brawley School Road will serve two functions. Through the provision of a connector between NC 903 East and US 258 north, traffic volumes on Main Street will be reduced and movement between the northern and eastern sectors of town will be facilitated. A 36 foot curb and gutter cross section as shown in Figure 3, Section K. is recommended.

SR 1117 is a major thoroughfare from the northwest.

Minor Thoroughfares

Chestnut Street from Ninth Street to 16th Street is proposed as a minor thoroughfare and functions as a crosstown route.

Edwards Fork Road (SR 1804) is a minor collector from the east.

Traffic Operations

Improvement of traffic conditions and safety can be achieved for relatively little expense through more efficient utilization of existing streets. Such improvements can be made on Main Street in the CBD. The existing cross-section of 72 feet will provide an adequate level of service if center of the street parking is removed and it is restriped to a five lane facility. Four travel lanes and a center turn lane will result in smoother traffic flow and increased safety due to greater capacity and sight distance.

US 258 north of 13th Street should be restriped to a four lane facility with no parking when traffic volumes warrant such improvements.

Recommended cross-sections for Scotland Neck thoroughfares are listed in Appendix A, Table 1. Ultimate recommendations are given in parentheses and indicate improvements which may be desirable in the future but are not necessary within the design period.

Construction Cost Estimate

Construction cost estimates are based on general state-wide averages of construction costs. Final costs will vary from these estimates. The total cost estimate for construction of the Brawley School Road extension to NC 903 and improvement of the existing cross-section is \$595,000.

FIGURE 2



SCOTLAND NECK NORTH CAROLINA

LEGEND:

MAJOR THOROUGHFARE
MINOR THOROUGHFARE

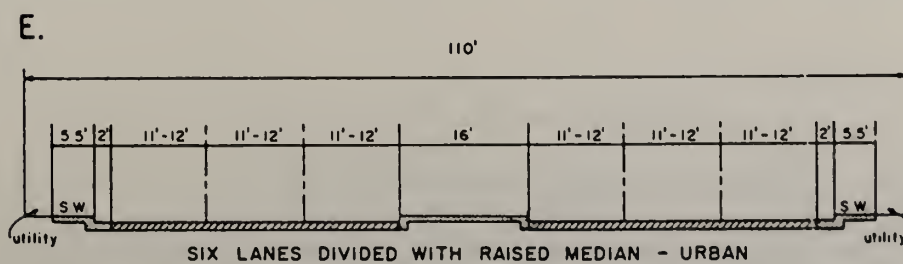
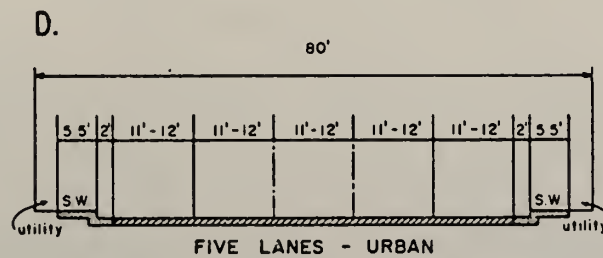
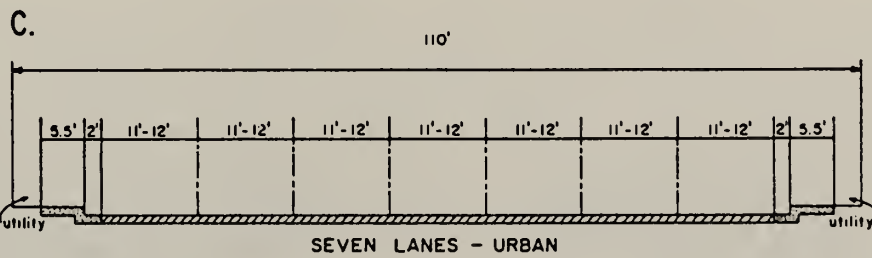
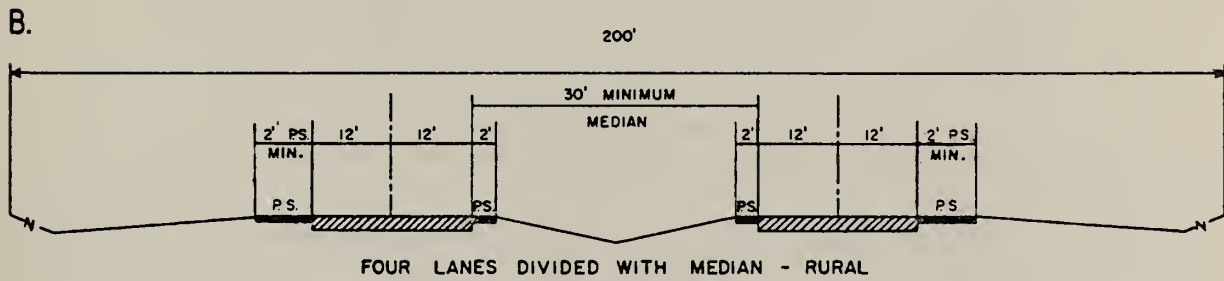
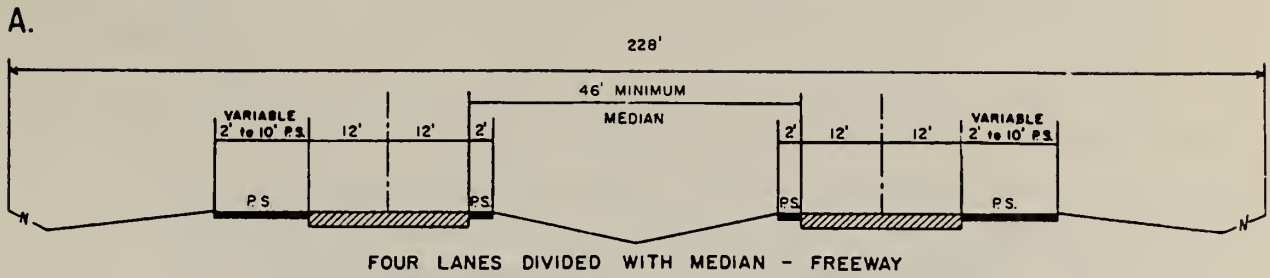
EXISTING PROPOSED
————— —————
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THE INFORMATION ON THIS MAP WAS PROVIDED BY THE
TOWN OF SCOTLAND NECK, NORTH CAROLINA. THE TOWN OF
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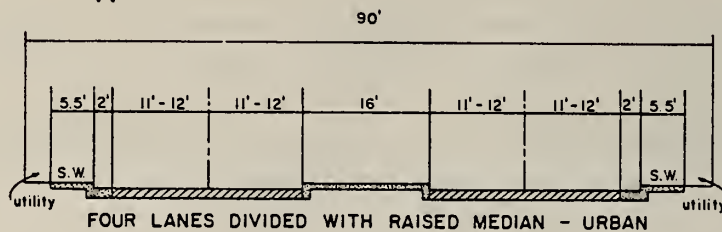
TYPICAL THOROUGHFARE CROSS SECTIONS

FIGURE 3

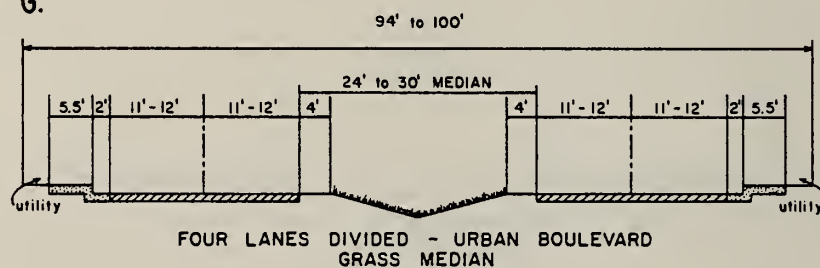


TYPICAL THOROUGHFARE CROSS SECTIONS (CONTINUED)

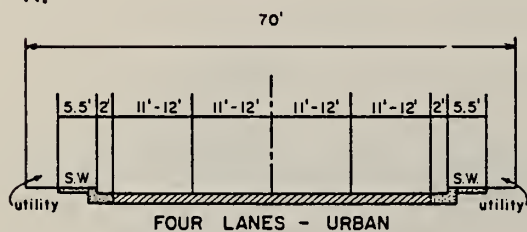
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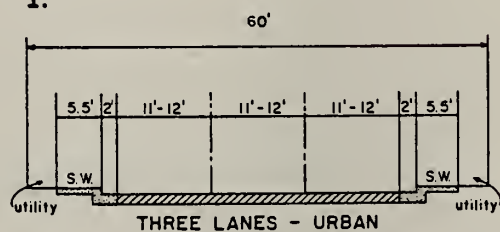
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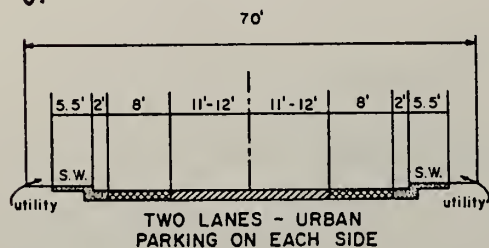
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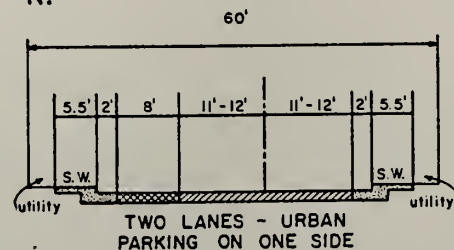
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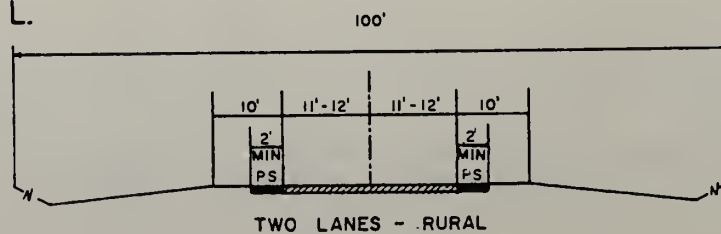
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V. IMPLEMENTATION

There are several tools which are available for implementation of the thoroughfare plan. They are as follows:

State and Municipal Adoption of the Thoroughfare Plan

Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provides that after development of a thoroughfare plan, the plan may be adopted by the governing body of the municipality and the Board of Transportation as the basis for future street and highway improvements. After the thoroughfare plan has been mutually adopted by the Town of Scotland Neck and the North Carolina Department of Transportation, negotiations will begin to determine which of the existing and proposed thoroughfares will be a Board of Transportation responsibility and which will be a municipal responsibility. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways; however, the municipality will share in the right-of-way costs with the municipality's share of the cost to be determined at time of construction.

Chapter 136, Article 3A, Section 136-66.1 of the General Statutes provides guidance in the delineation of responsibilities. In summary, these statutes provide that the Department of Transportation shall be responsible for those facilities which serve volumes of through traffic and traffic from outside the area to major business, industrial, governmental and institutional destination located inside the municipality. The municipality is responsible for those facilities which serve primarily internal travel.

Subdivision Control

A subdivision ordinance requires that every subdivider submit to the City Planning Commission a plot of his proposed subdivision. Certain standards must be met by the developer before he can be issued a building permit to construct his development. Through this process, it is possible to reserve or protect the necessary rights of way for projected streets which are a part of the thoroughfare plan and to require street construction in accordance with the plan (See Appendix B).

Official Street Map

A municipality may, through special enabling legislation, adopt an official street map which indicates both existing and future street lines. No new construction or reconstruction of structures would be permitted within the

designated future street lines. This would, over a period of time, reduce the cost of additional right of way along densely developed thoroughfares which will require widening at some future date.

Future street lines should be established to provide for the ultimate right of way specified in Appendix A for Brawley School Road.

Zoning

A zoning ordinance can be beneficial to thoroughfare planning in that planned locations of various land uses and planned densities of dwellings can be realized. This provides a degree of stability on which to make future traffic projections and to plan streets and highways.

Other benefits of a good zoning ordinance are: (1) the establishment of standards of development which will aid traffic operations on major thoroughfares, and (2) the minimization of strip commercial development which creates traffic friction and increases the traffic accident potential.

Capital Improvements Program

One of the tools which makes it easier to build a planned thoroughfare system is a capital improvements program. This is a long range plan for the spending of money on street improvements, acquisition of rights-of-way, and other capital improvements within the bounds of projected revenues. Municipal funds should be available for construction of street improvements which are a municipal responsibility, right of way cost sharing on facilities designated a Division of Highways responsibility, and advance purchase of right of way where such action is required.

MH/dc

APPENDICES

APPENDIX A TABLE 1
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

* FACILITY & SECTION		* EXISTING			* CAPACITY			* RECOMMENDED	
		* X - SECTION			* X - SECTION			* X - SECTION	
		DIST	*RDWY*	*ROW*	*CURRENT	* 1981	* 2000	* RDWAY	* ROW
		* MI	* FT	*FT	*(FUTURE)*	ADTS	ADTS	*(ULT)	*(ULT)*

BRAWLEY SCH RD (16TH ST)									
MAIN-13TH		0.64	18	-	(5000)	-	-		K
13TH-NC 903 (PROPOSED)		0.55	-	-	(5000)	-	-		K
CHESTNUT STREET									
9TH ST-BRAWLEY SCH RD		0.45	27	-	9500	-	-		
EDWARDS FORK RD (SR 1804)									
EPAB-ECL SCOTLAND NECK		1.21	18	-	4000	500	700		(20)
ECL SCOT NECK-NC 125		0.28	18	-	4000	550	770		(20)
MAIN STREET (US 258)									
SPAB-SCL SCOTLAND NECK		0.97	53	100	16000	4100	5700		
SCL SCOT NECK-NC 125		0.27	53	-	16000	4300	6000		
NC 125-SEVENTH STREET		0.27	68	-	16000	9100	13000		
SEVENTH-NINTH ST		0.18	72	-	16000	9100	13000		
NINTH-TWELFTH ST		0.26	72	-	16000	11100	15500		
TWELFTH-13TH ST		0.08	72	-	16000	7000	9800		
13TH-16TH ST		0.27	52	-	16000	6500	9100		
16TH-.43 MI. NORTH		0.43	36	-	12000	6000	8400		
.43 MI N OF 16TH-NCL		0.10	20	60	5000	4500	6500		K
NCL SCOTLAND NECK-NPAB		0.98	24	60	6500	4500	6500		(K)
NC 125									
SPAB-SCL SCOTLAND NECK		1.06	24	60	6500	2300	3200		
SCL-.20 MI N OF SCL		0.20	24	60	8500	3700	5200		
.2 MI N OF SCL-US 258		0.05	44	60	16000	3700	5200		
COMMON US 258 TO 12TH		0.71	-	-	-	-	-		
MAIN-N CHURCH ST		0.09	27	60	9500	3100	4300		
N CHURCH-BRYAN AVE		0.28	37	60	12000	2800	4100		
BRYAN AVE-WCL SCOT NECK		0.06	28	60	9500	2800	4100		
WCL SCOT NECK- WPAB		1.25	20	60	5000	2400	3400		
NC 903									
EPAB-ECL SCOTLAND NECK		0.92	22	60	5500	2500	3500		
ECL SCOT NECK-US 258		0.53	27	60	9500	2500	3500		
COMMON US 258 TO 12TH		0.26	-	-	-	-	-		
MAIN-WCL COMMON NC 125									
SR 1117									
NWPAB-US 258		0.98	18	60	4000	500	700		(20)
TWELFTH ST									
MAIN-BRAWLEY SCH EXT		0.68	36	-	12000	-	-		

APPENDIX B

RECOMMENDED DEFINITIONS AND DESIGN STANDARDS FOR SUBDIVISION ORDINANCES

DEFINITIONS:

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - A rural link in a network of continuous routes serving corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. Minor Arterial - A rural link in a network joining cities and larger towns and providing intrastate and intercounty service at relatively high overall travel speeds with minimum interference to through movement.
3. Major Collector - A road which serves major intracounty travel corridors and traffic generators and provides access to the Arterial system.
4. Minor Collector - A road which provides service to small local communities and links the locally important traffic generators with their rural hinterland.
5. Local Road - A local road that serves primarily to provide access to adjacent land and for travel over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, other freeway, expressway, or parkway links, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.

2. Minor Thoroughfares - Minor thoroughfares are important streets in the city system and perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating a minor through-traffic movement and may also serve abutting property.
3. Local Street - A local street is any link not on a higher-order urban system and serves primarily to provide direct access to abutting land and access to higher systems.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway - Divided multilane roadways designed to carry large volumes of traffic at relatively high speeds. A freeway is a divided highway providing for continuous flow of vehicles with no direct access to abutting property or streets and with access to selected crossroads provided via connecting ramps. An expressway is a divided highway with full or partial control of access and generally with grade separations at major intersections. A parkway is a highway for noncommercial traffic, with full or partial control of access, and usually located within a park or a ribbon of parklike development.
2. Residential Collector Street - A local access street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
3. Local Residential Street - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. Cul-de-sac - A short street having but one end open to traffic and the other end being permanently terminated and a vehicular turn around provided.

5. Frontage Road - A local street or road that is parallel to a full or partial access controlled facility and functions to provide access to adjacent land.
6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

- A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.
- B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.
- C. Lot - A portion of a subdivision, or any other parcel of land, intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".
 1. Corner Lot - A lot abutting upon two streets at their intersection.
 2. Double-Frontage Lot - A continuous (through) lot which is accessible from both of the parallel streets upon which it fronts.
 3. Reverse-Frontage Lot - A continuous (through) lot which is accessible from only one of the parallel streets upon which it fronts.

III. Subdivision

- A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.
- B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale or building development, and all divisions of land involving the dedication of a new street or a change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or recombination of portions of previously platted lots where the total number of lots is not increased

and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than five acres where no street right-of way dedication is involved; (3) the public acquisition by purchase of strips of land for the widening or opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

- C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. Since a transfer of property is involved, the dedication is made by written instrument and is completed with an acceptance.
- D. Reservation - A reservation of land does not involve any transfer of property rights. It simply constitutes an obligation to keep property free from development for a stated period of time.

Design Standards

I. Streets and Roads:

The design of all streets and roads within _____ shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHO) manuals.

The provision of street rights-of-way shall conform and meet the requirements of the thoroughfare plan for _____ as adopted by the _____ and the North Carolina Department of Transportation.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

The urban planning area shall consist of that area within the urban planning boundary as depicted on the mutually adopted _____ Thoroughfare Plan. The rural planning area shall be that area outside the urban planning boundary.

- A. Right-of-Way Widths: Right-of-way widths shall not be less than the following and shall apply except in those cases where right-of-way requirements have been specifically set out in the Thoroughfare Plan.

Min. Right of Way, Ft.

1. Rural

a.	Principal Arterial	
	Freeways	350
	Other	200
b.	Minor Arterial	100
c.	Major Collector	100
d.	Minor Collector	100
e.	Local Road	*60

*The desirable minimum right-of-way is 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate on local residential streets.

2. Urban

- | | | |
|----|--|------------|
| a. | Major Thoroughfare Other
than Freeway and
Expressway | 90 |
| b. | Minor Thoroughfare | 70 |
| c. | Local Street | *60 |
| d. | Cul-de-sac | **Variable |

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. In all cases in which right-of-way is sought for an access controlled facility, the subdivider will only be required to make a reservation.

A partial width right-of-way, not less than sixty (60) feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

- B. Street Widths: Widths for street and road classifications other than local shall be as required by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential
 Curb and gutter section 26 feet,
 to face of curb
 Shoulder section - 20 feet to edge of
 pavement, 4 foot shoulders

*The desirable minimum right-of-way is established as 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate.

**The right-of-way dimension will depend on radius used for vehicular turn-around. Distance from edge of pavement of turn around to right-of-way should not be less than distance from edge of pavement to right-of-way on street approaching turn-around.

2. Residential Collector

Curb and gutter section 34 feet, face
to face of curb

Shoulder Section 20 feet to edge of
pavement, 6 foot shoulders

- C. Geometric Characteristics: The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed

The design speeds for subdivisions type streets shall be:

	Desirable	(Minimum)		
		Level	Rolling	Mountainous
Rural				
Minor Collector Roads	60	(50)	(40)	(30)
Local Roads including Residential Collectors and Local Residential	50	(50)*	(40)*	(30)*
Urban				
Major Thoroughfares Other than Freeway or Expressway	60	(50)	(50)	(50)
Minor Thoroughfares	60	(50)	(40)	(40)
Local Streets	40	(40)**	(30)**	(20)**

*Based on projected annual average daily traffic of 400-750. In cases where road will serve a very limited area and small number of dwelling units, minimum design speeds can be reduced further.

**Based on projected annual average daily traffic of 50-250.

2. Maximum and Minimum Grades

- a. The maximum grades in percent shall be:

Design Speed	Level	Rolling	Mountainous
60	3	4	6
50	4	5	7
40	5	6	8
30		9	10
20			12

- b. A minimum grade for curbed streets normally should not be less than 0.5%, a grade of 0.35% may be allowed where there is a high type pavement accurately crowned and in areas where special drainage conditions may control.
- c. Grades for 100 feet each way from intersections should not exceed 5%.
- d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% greater.

3. Minimum Sight Distances

In the interest of public safety, no less than the minimum sight distance applicable shall be provided in every instance. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters. (General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case):

<u>Design Speed, MPH</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>
Stopping Sight Distance -					
Min. Distance, Ft.	150	200	275	350	475
Des. Distance, Ft.	150	200	300	450	650

Min. K* Value For:

Min. Crest Curve	16	28	55	85	160
Des. Crest Curve	16	28	65	145	300
Min. SAG Curve	24	35	55	75	105
Des. SAG Curve	24	35	60	100	155

Passing Sight Distance -

Min. Passing Distance, Feet (2 lane)	1100	1500	1800	2100
Min. K* Value For Crest Vertical Curve	365	686	985	1340

Sight distance provided for stopped vehicles at intersections should be in accordance with, "A Policy on Geometric Design of Rural Highways".

4. The following table shows the maximum degree of curve and related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads wth no curb and gutter is .08. The maximum rate of superelevation for urban streets with curb and gutter is .06 with .04 being desirable.

*K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide minimum sight distance.

Design Speed MPH	Maximum e*	Minimum Radius (Rounded) Feet	Maximum Degree of Curve (Rounded) Degrees
20	.04	125	45.0
30	.04	300	19.0
40	.04	560	10.0
50	.04	925	6.0
60	.04	1410	4.0
20	.06	115	50.0
30	.06	275	21.0
40	.06	510	11.5
50	.06	830	7.0
60	.06	1260	4.5
20	.08	110	53.5
30	.08	250	23.0
40	.08	460	12.5
50	.08	760	7.5
60	.08	1140	5.0

*e = rate of roadway superelevation, foot per foot

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty (60) degrees.
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Off-set intersections are to be avoided unless exception is granted by the Division of Highways for intersections involving the State Highway System, or the Planning Board for intersections involving only the municipal street system. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

E. Cul-de-sacs

Cul-de-sacs, unless exception is granted by the local planning board, shall not be more than five hundred (500) feet in length. The distance from the edge of pavement on the vehicular turnaround to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn-around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access.

Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least twenty (20) feet.
3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn-around facilities at the dead-end as may be approved by the Planning Board.
4. Sharp changes in alignment and grade shall be avoided.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the nearest District Engineer of the Division of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

I. Wheel Chair Ramps

In accordance with Chapter 136, Article 2A, §136-44.14, all street curbs in North Carolina being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason after September 1, 1973, shall provide wheelchair ramps for the physically handicapped at all intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Wheelchair ramps and depressed curbs shall be constructed in accordance with details contained in the Department of Transportation, Division of Highways, Publication entitled, "Guidelines, Curb Cuts and Ramps for Handicapped Persons".

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

- a. Shoulder Section Approach

- i. Under 800 ADT Design Year

Minimum 28 feet width face to face of parapets or rails or pavement width plus 10 feet, whichever is greater.

- ii. 800-2000 ADT Design Year

Minimum 34 feet width face to face of parapets or rails or pavement width plus 12 feet, whichever is greater.

- iii. Over 2000 ADT Design Year

Minimum 40 feet
Desirable 44 feet width face to face of parapets or rails.

- b. Curbs and Gutter Approach

- i. Under 800 ADT Design Year

Minimum 24 feet face to face of curbs.

ii. Over 800 ADT Design Year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:
 - a. Shoulder Section Approach - Width of approach pavement plus width of usable shoulders on the approach left and right.
Min. 8'
Des. 10'
 - b. Curb and Gutter Approach - Width of approach pavement measured face to face of curbs.

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